Determination of the matrix effect on Aroma Effusion

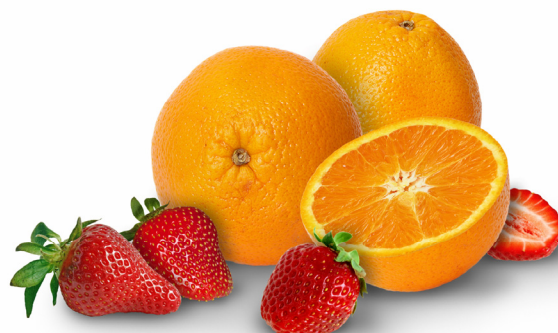## FlavourSpec®-Your tool for fast aroma Screening

A change in the formulation of food and beaverages typically results in a variation of the aroma perception. Besides impacts from aroma carrying ingredients, the food matrix itself can cause changes in the release of individual flavour compounds. Especially variations in the salt and fat content significantly effects the release of hydrophilic and lipophilic flavour compounds.

Due to the complexity of aroma compositions it is generally impossible to predict the effects of changes in the formulation on the resulting perception. So any adjustment of food formulations to *regulatory affairs* (e.g. reduction of salt in food as demanded by the WHO), *marketing strategies* (e.g. ‚low fat') or *puchasing department* (price reduced commodities) demands time- and cost-intensive determination of the aroma perception of the resulting product.

The impact of the matrix on the aroma effusion can be tested through an accurate determination of the portions of the individual flavour compounds in the headspace.

To assure comparability with the human perception and validity the sensitivity of instrumentation has to be lower than the odour threshold of the respective compund.

The aroma release of different dairy products spiked with equal amounts of a natural aromata was determined. Figure 1 compiles the heatmaps of the daries' headspace by the use of the FlavourSpec®.
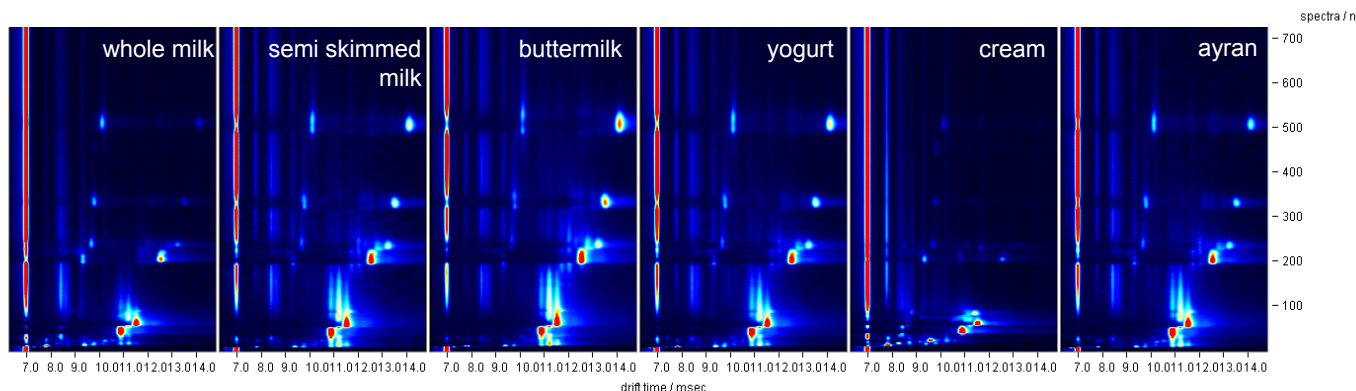
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Figure 1: GC-IMS Chromatograms of the headspace of strawberry aromatized Dairies

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The two dimensional separation of the headspace compounds by gas chromatography and ion mobility spectrometry (GC-IMS) allows an individual evaluation of headspace compounds. Figure 2 plots the IMS intensities of selected strawberry aroma compounds. It is obvious that the different matrices of the diary products significantly affect the effusion of the aroma compounds.

Besides re-designing of product aromas frequent montioring in terms of quality control can uncover unwanted variations of the product aroma due to changes in the production process.

Instead of a laborious and detailed evaluation of the measurement data G.A.S. offers an automated similarity analysis by the use of its FlavourMatch software. Hereby the similarity of the headspace compositon with respect to trained samples (reference product) is automatically calculated based on the occurence and concentration of individual compounds. Figure 3 displays a radar plot as possible result visualization of the similarity analysis of the aromatized dairies using a respective reference measurement set.
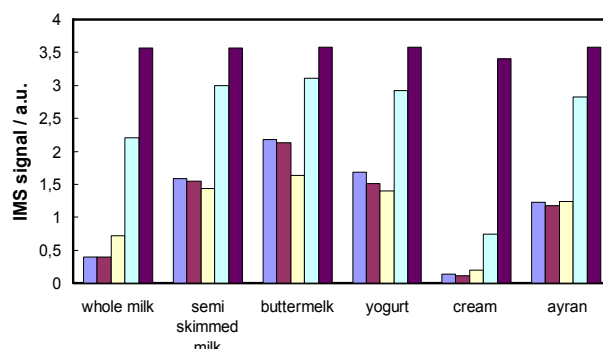
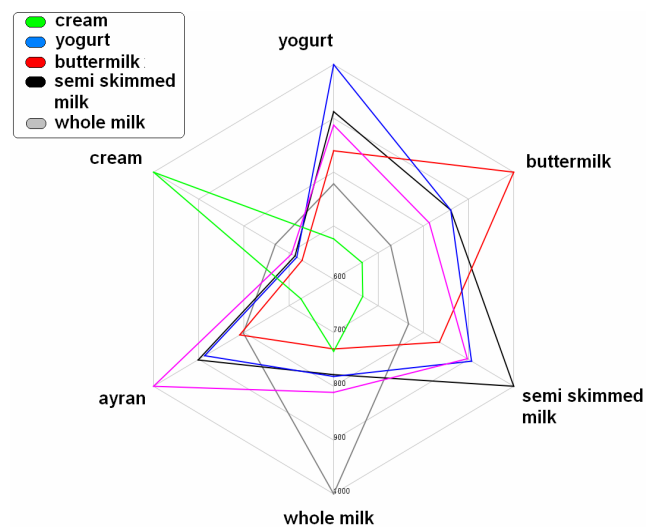*Figure 2: IMS signal intensities of selected strawberry aroma compounds from different dairies*

Figure 3: Automated similarity analysis of strawberry aroma spiked dairies